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## Population and Globalization\*

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### Abstract

We consider how globalization has affected demographic trends and how demographic trends have affected globalization. We focus on developments over the last 200 years and emphasize “economic globalization”—the integration of product, capital, and labor markets and the rapid diffusion of technology and information across borders. We begin by relating a brief history of economic globalization since 1850 and then identify demographic trends that may have significant effects on economic globalization. We consider how globalization has affected demographic trends and then discuss how demographic trends have affected globalization. We conclude by reflecting on how our analysis is affected by the increased pace of globalization over the last 40 years.

**Keywords:** globalization, population, trade, saving, international capital flows, investment, development

Globalization is not new, and neither is its interaction with demographic trends. Alexander the Great's conquest of the Middle East instilled Greek culture in a vast population ranging from North Africa to India; and Roman, Chinese, and Mayan empires brought dominant languages and new immigrants to conquered regions. The movement of goods along the thousands of miles of the Silk Road trade route raised wages and wealth in both China and Europe in the Middle Ages without inducing major flows of population from one region to another; at the same time it facilitated the transmission of the Black Plague from Mongolia to Europe. The global diffusion of vaccines preventing

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polio, smallpox, and measles reduced death rates dramatically in developed countries after 1870 and in developing countries after 1945. In contrast with continued increases in life expectancy in Asia, the Americas, and Western Europe, life expectancy has collapsed in sub-Saharan Africa, Russia, Central Asia, and Eastern Europe since 1990. The globalization of war over the last 250 years has entailed the temporary migration of millions of soldiers and the often more permanent migration of millions of refugees. Changing population age structures induced global flows of capital in both the nineteenth and twentieth centuries, while international immigration was a critical cause of relative and absolute factor price convergence across Europe and the Americas. And the large increase in world population over the last 300 years may be at least in part responsible for the recent surge in inventions that have markedly reduced computing and communication costs and, consequently, set off the most recent surge in globalization.

Our goal in this article is to consider how globalization has affected demographic trends and how demographic trends have affected globalization. Our survey of these issues is far from comprehensive, as we focus on developments over the last 200 years and emphasize economic aspects of globalization. The economic perspective is an important distinguishing feature of this article, entailing a narrow view of globalization that focuses on the integration of product, capital, and labor markets and the rapid diffusion of technology and information across borders. Demographers have spent considerable effort analyzing how global forces have affected demographic trends—that is, how the rapid international diffusion of birth control technology has reduced birth rates, how the international diffusion of public health measures has reduced death rates, and how changing relative wages have affected female labor force participation and marriage rates. Less attention has been paid to how demographic trends have affected globalization. Does a growing population necessarily lead to more integrated labor or product markets or to increased international diffusion of technologies? Does an aging population necessarily lead to increased international capital flows, or instead to increased xenophobia and increasingly closed markets?

We begin in Section I by considering why narratives of globalization differ so markedly depending on the perspectives of those telling the story. Section II relates a brief history of economic globalization since 1850. Section III focuses on identifying demographic trends that may have significant effects on economic globalization. Section IV considers how globalization has affected demographic trends, whereas Section V considers how demographic trends have affected globalization. We conclude, in Section VI, by reflecting on how our analysis is affected by the increased pace of globalization over the last 40 years.

## I Globalization and Population: Perspectives and Prelude

Stories of globalization are widely contested. Some analysts view globalization as a process by which the powerful exploit the weak in increasingly remote areas of the globe; others view it as a process by which all countries increase their wealth. Both views have an element of truth and depend on the perspective of the analyst. Advantages in armaments and opponents' susceptibility to disease allowed a few European countries and their offshoots to colonize societies throughout Africa, the Americas, Europe, Asia, Australasia, and the Pacific between 1492 and 1945.<sup>1)</sup> In contrast, others emphasize how international flows of capital, labor, intermediate goods, and final goods in the nineteenth and twentieth centuries led to absolute factor price convergence across rich and poor countries whereas restrictions on those flows led to divergence. Similar contrasts can be drawn on numerous issues—for example, the spread of disease by global conquest, trade, and tourism versus the spread of vaccines by international agencies; and the development of virtual communities of dispersed ethnic groups versus the reduction in cultural variety induced by mass consumption of a hegemonic culture. Much of the debate can be traced back to whether the analyst believes in the enlightenment concept of progress or instead believes that unintended consequences of new production and organization technologies often have pernicious indirect effects that outweigh the direct gains accruing to societies with high levels of market integration, information flows, and technological innovation.

The contested-stories analogy carries over to the field of population. Debate has raged over the effects of a growing global population on the environment, resources, income, innovation, and social relations. Some demographers and economists have focused on how increasing global population could exhaust resources, alter the climate in life-threatening ways, and increase congestion costs to unacceptable levels. Others have focused on how larger global populations could generate new waves of innovation with the potential to offset most of the costs described above. Some analysts draw from both of the above perspectives while emphasizing that individual decisions concerning marriage, labor force participation, children, medical care, and education are made on the basis of private costs and benefits that frequently diverge from social costs and benefits and, therefore, result in outcomes that are often inefficient.

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1) Our dating of "world wars" should be revised. A redating would show *five* world wars over the last 250 years rather than two. In this scheme the first world war was the war between Britain and France, known in the United States as the French-Indian War, which was fought over five continents between 1759 and 1764. The second world war consisted of the several Napoleonic Wars (1794–1815) that were fought over five continents and generated South America's independence revolutions. World Wars I and II (now III and IV) were, of course, followed by the Cold War (World War V).

The interaction between population and globalization clearly goes back to prehistorical periods when early human beings slowly migrated from Africa to distant land areas across the globe. One can, however, date an acceleration of the interaction at 1492. The arrival of European explorers in the Americas and their conquest of the Inca and Mayan empires set off an unprecedented wave of depopulation among Native Americans due to the spread of smallpox, measles, mumps, and other diseases to which Native Americans had little immunity.<sup>2)</sup> Disease and the enslavement of conquered populations by the Portuguese and Spanish reduced the Native American population by roughly 90 percent during the sixteenth and seventeenth centuries. Similar demographic catastrophes would be repeated with Aborigines in Australia and Pacific Islanders in the eighteenth and nineteenth centuries after contact with Europeans.<sup>3)</sup> The depopulation of the Americas and Australia was one of the factors that led to the enslavement and forced migration of 11–12 million Africans from the 1520s through 1888 and voluntary immigration of 54 million people between 1815 and 1930 from land-poor, labor-abundant Europe.<sup>4)</sup> European susceptibility to tropical diseases limited settler immigration to Africa to the Northern and Southern extremes, but colonization of tropical Africa was eventually completed in the late nineteenth century [Curtin 1989]. World population growth, proceeding at low but positive levels since roughly 1,000, received a jolt with the agricultural revolutions of the seventeenth and eighteenth centuries. The improved nutrition, reduced mortality rates, and increasing population growth rates in Western Europe set the stage for the beginning of the demographic transitions (see Section III below), the signal demographic phenomena of the last 250 years.

## II Economic Globalization since 1850

Although globalization trends have had enormous effects on demographic trends since 1492, we focus on globalization since 1850 because its ebbs and flows over the last 152 years provide key insights into our current situation. We subdivide the 1850–2002 period into three periods based on divergent trends in economic globalization: Globalization in a Colonial World (1850–1914), Retreat from Globalization (1914–45), and Globalization in a Postcolonial World (1945–present).

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2 ) See Bentley and Ziegler [2000] for an overview of the conquest of the Americas and population decline there.

3 ) See Butlin [1983] for a discussion of Aboriginal population decline and Bushnell [1993] for a review of the controversy over the extent of the decline in Hawaiian population after European contact.

4 ) See Baines [1991] for an overview of nineteenth-century European migration to the Americas and Hatton and Williamson [1998] for a more in-depth analysis of the causes of immigration and the effects on sending and receiving economies. See Fogel [1989] for a comprehensive discussion of the introduction of slavery to the Americas.

*Extent of Globalization in 1850*

At the beginning of the first period (1850), market integration across Europe and across the globe was limited, and information and technology diffused slowly. Tariffs were high in most industrialized countries, and the effect was to limit international trade flows. Capital markets were growing in importance, yet were still undeveloped, trading few financial instruments and with listings for only the largest railroads, banks, trading companies, and utilities. Their limited development meant that capital flows across national borders constituted a large portion of investment for only a small number of countries. Foreign direct investment was extremely limited. Immigration from Europe to the Americas and Australasia had been slowly increasing, but the flows were still small proportions of the growing European populations. There are many well-known cases of rapid technology diffusion across national boundaries during this period—for example, Samuel Slater's transfer of cotton-spinning technology from England to Rhode Island in 1790—but, as a rule, technology diffused with long and variable delays. In sum, both dimensions of economic globalization, international market integration and information and technology diffusion, were extremely limited.

*Globalization in a Colonial World: 1850–1914*

During this first period (1850–1914), economic globalization proceeded at a rapid pace, leading to an unprecedented degree of capital, labor, and product market integration by the end of the century. The most important force behind the globalization push in this period was the reduction in land- and sea-transport costs, with the largest absolute reductions coming in land transport and the largest percentage reductions in sea transport [O'Rourke and Williamson 1999: Ch. 3]. The opening of the Suez and Panama canals during this period also helped to reduce transcontinental price gaps. The lower transportation costs led to a surge in international trade, which in turn produced a convergence in the Anglo-American prices of important products such as wheat (from a 57.6 percent gap in Chicago-Liverpool prices in 1870 to a 15.6 percent gap by 1913), meat (from more than a 100 percent gap in Cincinnati-London prices in 1880 to a 17.9 percent gap by 1913), iron bars (from a 75 percent gap in London-Philadelphia prices in 1870 to a 20.6 percent gap by 1913), copper (from a 32.7 percent gap in London-Philadelphia prices in 1870 to roughly no gap by 1913), coal, tin, wool, and coffee [Harley 1980]. Declining transportation costs massively reduced price gaps between Europe and Asia on cotton, jute, and rice (from a 93 percent price gap between London and Rangoon in 1870 to a 26 percent gap in 1913) [O'Rourke and Williamson 1999: Ch. 3; see also Williamson 2002]. Great Britain's 1846 repeal of its Corn Laws, which had imposed tariffs on grain imports, and the 1860 Cobden-Chevalier treaty between Great Britain and France, reducing tariffs substantially and providing for most-favored-nation treatment, led the way to a series of treaties liberalizing trade in Europe.

With tariffs and transport costs declining and the gold standard reducing exchange-

**Table 1** Merchandise Exports as a Percentage of GDP in 1990 Prices

Region	1870	1913	1950	1973	1998
Western Europe	8.8	14.1	8.7	18.7	35.8
Western European Offshoots	3.3	4.7	3.8	6.3	12.7
Eastern Europe & Former U. S. S. R.	1.6	2.5	2.1	6.2	13.2
Latin America	9.7	9	6.0	4.7	9.7
Asia	1.7	3.4	4.2	9.6	12.6
Africa	5.8	20.0	15.1	18.4	14.8
World	4.6	7.9	5.5	10.5	17.2

Source: [Maddison 2001: 127]

rate uncertainty, the share of trade in gross domestic product (GDP) increased in every region except Latin America, where it declined slightly (Table 1). Trade shares doubled in Asia, more than tripled in Africa, went up by 42 percent in Western settler economies, and increased by 60 percent in Western Europe [Maddison 2001: 127].

Falling transportation costs, lower prices of agricultural goods in Europe, and surging wages in the United States prompted a massive flow of immigrants from Europe to North America, South America, and Australia; from India to Africa and Asia; from China to Southeast Asia and the United States; and from Japan to North America, South America, and Hawaii in the late nineteenth and early twentieth centuries. Transport costs between Southern Europe and South America fell to such low levels that they supported seasonal flows of workers between the two regions.<sup>5)</sup> Immigration to the United States increased from 4.9 per 1,000 population in 1850 to 11.3 per 1,000 in 1910, reaching record levels between 1870 and 1913. The growing integration of world capital and product markets was a major factor behind the increased immigration flows. Lower transportation costs and lower European tariff rates on agricultural products induced a flood of U.S. agricultural exports to Europe in the later decades of the nineteenth century. The declining prices of agricultural products and other imported products hurt European farmers and industrial workers in import-competing industries, and some decided to emigrate to the Americas and Australasia.

The spread of the gold standard over the second half of the nineteenth century; the development of broader and deeper equity markets in the United States, Canada, and Europe; the higher saving rates in France, England, and Germany—possibly generated by the demographic transition in these countries; and an increasing propensity to invest overseas in Germany and Great Britain led to large flows of capital from Western Europe to Eastern Europe, South America, and North America between 1870 and 1913. Large balance-of-payments deficits by the resource-rich, labor-poor, capital-poor countries of the Americas were common during this period and facilitated immigration from Europe

5) See Hatton and Williamson [1998] for a discussion of Southern Europe–Argentina seasonal immigration and La Croix and Fishback [2000] for a discussion of temporary migration from Japan to Hawaii.

to the Americas by ensuring that new immigrants would be equipped with new capital.<sup>6)</sup>

*Retreat from Globalization: 1914–45*

A backlash against economic globalization began to emerge near the end of the first period [Williamson 1998]. The United States restricted immigration from Asia with the Chinese Exclusion Act (1882) and the Gentlemen's Agreement with Japan (1907). In reaction to the flood of American agricultural products entering Europe in the 1880s, Germany, Sweden, France, and many other European countries began to re-impose tariffs on grain imports and raw materials in the late 1880s and early 1890s. Only Great Britain, Denmark, the Netherlands, and some countries (*e. g.*, Japan) and colonies with gunboat-imposed trade policies retained relatively liberal trade policies.

The beginning of the second period was marked by a shattering global war, World War I, which brought economic globalization to a halt and set in motion forces that would ultimately reverse virtually all of the labor, capital, and product market integration achieved in the earlier Globalization Period. Newly created states in Europe produced refugee flows and fragile, short-lived democracies [Mazower 1999]. Most industrialized countries left the gold standard during World War I and did not resume the standard again until the 1920s [Feinstein, Temin and Toniolo 1997]. With the notable exception of Great Britain, most countries did not resume the gold standard at the previous parity, thereby impairing investor confidence that foreign investments were not subject to severe exchange-rate risk.<sup>7)</sup> Britain's large wartime borrowings converted it from a net creditor to a net debtor and diminished its role as the main international financier. The United States, now a net creditor nation, was unable to replace the British flows because it did not have the requisite institutional infrastructure or depth of knowledge to undertake large-scale international lending. International capital flows to South America and Asia resumed at much lower levels after World War I (2–3 percent rather than 4–5 percent), declined during the 1920s, and descended to very low levels in the 1930s (1–1.5 percent), as international financial and domestic banking crises slowly unraveled the gold standard during the Great

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6) O'Rourke and Williamson [1999: 280–282] find that a large proportion of the catch-up and falling-behind of countries in Europe and the European periphery during the 1870–1914 period was due to labor migration and capital flows. Trade played a surprisingly small role in their convergence with or divergence from the GDP leaders.

7) See Eichengreen [1996]. Most countries involved in World War I financed part of their wartime expenditures and postwar expenditures with inflationary finance. To resume the gold standard at “parity”—the same exchange rate between the currency and gold when they left the gold standard, a country would have to be subjected to a difficult period of deflation. Given the expanded franchise and the weak condition of political parties in new European democracies, few governments could choose this course.



Depression.<sup>8)</sup>

Immigration from Europe to the United States was almost totally curtailed during World War I and World War II and was severely restricted in the interwar period by national legislation (1924 and 1927) that restricted annual immigration to just 160,000 people from outside the Americas and mandated that 40 percent of immigrants be from Great Britain and 33 percent from Germany.<sup>9)</sup> The redrawing of European borders at the 1919 Paris Conference stimulated large migration flows in Central and Eastern Europe. European countries responded by imposing immigration restrictions in the 1920s and 1930s, with only France remaining open to Eastern European migrants.

Higher tariffs were imposed throughout the industrialized world in the 1920s and 1930s, with the U.S. passage of the Smoot-Hawley tariff in 1930 provoking retaliatory responses in France, Great Britain, Germany, and most other industrialized countries. France, England, the United States, and Germany responded to the disintegration of the world financial and trading systems by forming regional trading blocs with colonial and regional partners during the 1930s. Although economics historians have debated whether the collapse of world trade during the 1930s was due to higher tariffs or the collapse of the world monetary system, the segmentation of national capital, labor, and product markets is widely accepted. The drastic decline in the share of trade in GDP during this period provides graphic evidence (Table 1). Increasing transportation costs also played a significant role in reducing the share of trade in GDP during the 1920s and 1930s [Estevadeoral, Frantz and Taylor 2002].

Other trends affecting economic globalization during this period of retreat were more positive. The expansion of the telephone network, the rapid adoption of the radio, the spread of the newsreel in theaters, and the expansion of higher-education institutions facilitated a more rapid dissemination of technologies and information. Expenditures on research and development declined during the Great Depression of the 1930s in Europe and the United States, but a large flow of new public health, medical, and nutritional technologies was still generated.

World War II provides a fourth example of global war. Capital was destroyed throughout the world; weapons of mass destruction were used on civilian populations in Asia and Europe; regional transportation networks and mobile extermination facilities reduced Hitler's costs of decimating Europe's Jewish population; and roughly 50–70 million people lost their lives through wartime combat, genocide, or famine. Two world wars in combination with the interwar depression left national factor and product markets operating virtually in isolation at the end of World War II. The international monetary system was in shambles; tariffs were high in virtually every country—a

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8) See Eichengreen [1998] for a full discussion of these issues. See Obstfeld and Taylor [1998] for data on capital flows between 1870 and 1990.

9) The 1927 legislation reduced the annual flow to 150,000 people. By comparison, annual immigration to the United States in 1910 had been 1,041,570 people.

hangover from the 1930s; and voluntary immigration was severely restricted, while post-war refugee flows numbered in the tens of millions in Japan, China, Korea, Europe, India, and Pakistan.

*Globalization in a Post-Colonial World: 1945–Present*

The flawed revival of the gold standard after World War I severely limited international capital flows, and after World War II countries acted to replace the gold standard with the Bretton Woods Agreement. Retaining fixed exchange rates and the veneer of a tie with gold, the new financial system allowed countries to implement exchange-rate controls that limited international capital flows. The dollar was linked to gold whereas other currencies were linked to the dollar. Most European currencies became convertible on the current account (but not on the capital account) only in 1958, and binding capital controls remained in place in the United States, Europe, Japan, and most of the developing world through the mid-1970s. As a result, capital flows stagnated at only 1 percent of GDP for 14 of the world's industrialized countries over the 1945–75 period [Obstfeld and Taylor 1998]. With the United States leading the way in the 1960s, Japan and the European countries began to remove capital controls in the 1970s, with the trend accelerating in the 1980s. Developing countries, under pressure from the International Monetary Fund, began the process of removing capital controls in the 1980s and 1990s.<sup>10)</sup>

The gradual restoration of integrated product markets in manufactured goods was accomplished over a 50-year period by gradual tariff reductions under the General Agreement on Tariffs and Trade (GATT)—now the World Trade Organization (WTO)—as well as by unilateral tariff reductions. Limited progress in trade in services has been made over the last 15 years, and the 1994 Uruguay Round Agreement specified a back-loaded dismantling of the Multifibre Agreement, an elaborate maze of quotas on textiles manufactured in low- and middle-income countries. Trade in agricultural products is still heavily protected by most industrialized countries, with elaborate systems of tariffs and quotas in place and complex political obstacles blocking future reform. The asymmetric liberalization of trade in manufactures relative to agriculture and textiles has hurt income growth in developing countries specializing in such labor- and land-intensive products. Despite the asymmetric liberalization, Sachs and Warner [1995] find that countries that liberalized trade in the post–World War II period experienced higher than average GDP growth. Incomes in poor countries with liberal trade policies generally converged with those in rich countries. This contrasts with results from the overall sample of countries in which incomes of poor and rich countries diverged over the course of the three globalization periods [Pritchett 1997].<sup>11)</sup>

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10) Some economists blame the removal of capital controls in Asian countries for the Asian financial crisis in the late 1990s. See, *e.g.*, Bhagwati [2000].

11) Poor countries with poor data are excluded from such cross-country studies, often biasing the results. See Frankel and Romer [1999] for additional supporting arguments and Rodríguez and Rodrik [2001] for contrary views.

Immigration, a major contributor to GDP convergence in the 1850–1914 period, has increased gradually in the post–World War II period and has served as an attenuating force on the demographic transition. Immigration can, for example, dampen population growth or the swings in age structure that occur during the transition. Sending populations are often those that are growing rapidly with heavy concentrations at young ages. Receiving countries are often those that are experiencing slower population growth and aging populations. Immigrants are frequently young workers who have children or begin families once they have relocated. The high rate of immigration into the United States over the last three decades is one of the key reasons why the U. S. age structure is expected to stay much younger than Japan's.

Between 1945 and 1965, immigration to the United States was very limited and restricted to European countries. Legislative reforms in 1965 opened the door to larger immigrant flows from a broader mix of countries.<sup>12)</sup> U. S. immigration flows are currently about the same as in the early twentieth century, but have a smaller impact on the U. S. economy and on sending economies because the U. S. population has almost tripled, growing from 99 million in 1910 to 287 million in 2002, and world population has more than tripled, increasing from 1.75 billion in 1910 to 6.14 billion in 2001. Some countries sending migrants to the larger U. S. economy have experienced significant reductions in their workforces in recent years.

Migration flows have also had large implications for other sending and receiving countries. Ethnic German populations migrated to West Germany after World War II and after the fall of the Berlin Wall. Repatriation of colonial populations after World War II, and refugees from civil wars generated large refugee flows in central Africa, Venezuela (from Colombia), Pakistan and Iran (from Afghanistan), Taiwan (from China), Korea (from North to South), and Vietnam. Temporary and permanent immigration within Europe and to Europe—from Africa, Asia, and Turkey—after World War II markedly increased the share of migrants in the labor forces of Switzerland (19 percent), Luxembourg (36 percent), Belgium (9 percent), Germany (9 percent), and Austria (9 percent); whereas inter-Asian migration has led to large shares of migrant workers in the labor forces of Hong Kong (9 percent), Malaysia (13 percent), and Singapore (44 percent). Since the mid-1990s, Europe has tightened regulations with respect to refugees, making it more difficult for them to enter and settle. Many of the small oil economies of the Middle East, including Saudi Arabia and Kuwait, have large percentages of migrant workers in their labor forces, many of them from Asian countries. And Israel's population has swelled as a result of migration from the Middle East and countries in the former Soviet Union.

Communication and transportation costs have continued to decline since World War II. The digitization of information and the expanding use of the Internet to distribute information have led to large declines in the cost of gathering information. The

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12) Our discussion of immigration relies heavily on Martin and Widgren [2002].

introduction and improvement of the jumbo jet and the continued standardization of sea and rail container shipment have combined to reduce the costs of transporting people and goods. As in the earlier two periods, continuing improvements in transportation and communication costs have the potential to diffuse information more rapidly and to increase life expectancy, via improvements in public health, nutrition, and medical treatment. The proliferation of nonprofit and intergovernmental organizations dedicated to improving economic, social, environmental, and demographic conditions in developing countries has also helped to speed the pace of globalization.

### III Demographic Transitions

The demographic transition is a singular historical period during which mortality and fertility rates decline from high to low levels in a particular country or region. The broad outlines of the transition are similar in countries around the world, but the pace and timing of the transition have varied considerably. In this section we describe this important demographic phenomenon, emphasizing three demographic variables that bear most directly on globalization: the size of national populations, their rates of growth, and their age structures. We then discuss the ways in which globalization has influenced the transition through its effects on fertility, mortality, and immigration.

The transition began earliest in Europe and in former European-settler colonies. Death rates began to decline in some European populations in the mid- or late-1700s. Fertility declined with a substantial lag in some cases and with a very short lag in others. The transition from high to low fertility took nearly 200 years in France but roughly 100 years in the United States.

The transition began later elsewhere, and the changes were often much more rapid once they began to occur. Mortality decline in Africa and Asia (Japan aside) was concentrated in the twentieth century, with substantial advances occurring both before and after World War II. Life expectancy in India was only 24 years at the beginning of the twentieth century, and life expectancy in China was only 24 years in 1929–31 [Maddison 2001: 30]. The total fertility rate did not drop below five births per woman in Japan until the 1930s, and in other Asian countries fertility decline did not begin until the 1950s or later. As a result, Asia and the rest of the developing world experienced rapid population growth in the decades after World War II and consequently rapid changes in their age structure. The United States and many other countries in the West experienced a post-World War II baby boom, which produced large swings in age structure that are in some respects similar to the swings in age structure produced by the demographic transition in Asia. The baby boom in the West resulted from rising birth rates, whereas the “baby boom” in the developing world resulted from declining infant and child mortality rates.

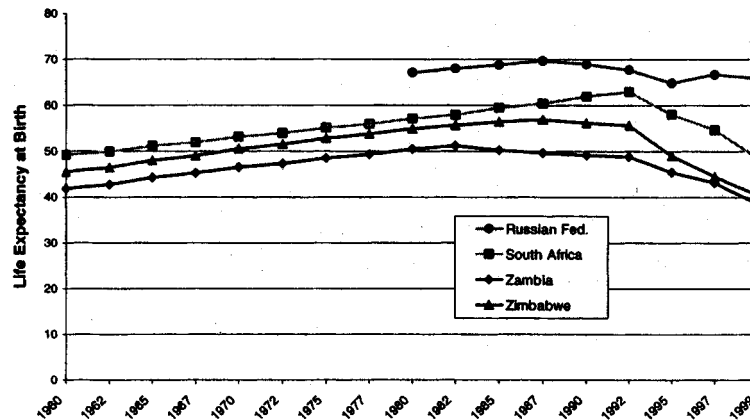


Fig. 1 Life Expectancy in Selected Countries: 1960–99

Source: [World Bank 2002]

Perhaps the most striking aspect of the demographic transition is the enormous gap in life expectancy that emerged between Japan and the West on the one hand and the rest of the world on the other. By 1820 a substantial gap in life expectancy at birth of 12 years had already emerged. By 1900 the gap had increased to 20 years as essentially all of the gains in life expectancy were confined to Japan and the West. Between 1900 and 1950 life expectancy improved significantly throughout the world, but the gap in life expectancy continued to rise, reaching 22 years in 1950. Only in the second half of the twentieth century was there any convergence, with the gap declining to 14 years in 1999.<sup>13)</sup>

Of course, averages sometimes hide important details. The gains in life expectancy outside the West would have been much greater had it not been for the devastating impact of the HIV/AIDS epidemic in sub-Saharan Africa and deteriorating conditions in Russia and some other Eastern European and Central Asian republics (see Fig. 1).

The differences in the timing of the demographic transition led to significant shifts in the global distribution of population. During the nineteenth century the populations of Europe and Western offshoots grew significantly in relation to the rest of the world. Between 1820 and 1900 their share of the world's population increased from 22.3 percent to 33.0 percent. The population share of Asia and Oceania dropped from 69.0 percent to 56.7 percent during the same period because its population was growing at only 0.2 percent per annum (Table 2). India and China both experienced long periods of economic stagnation and decline during the nineteenth century. India's decline was

13) Maddison [2001: 31] estimates a life expectancy at birth of 36 years in 1820, 46 years in 1900, 66 years in 1950, and 78 years in 1999 for Japan, Western Europe, and Western offshoots. For the other countries of the world he estimates a life expectancy of 24 years in 1820, 26 years in 1900, 44 years in 1950, and 64 years in 2000.

**Table 2** Population of Major Regions of the World, 1820–2050

Year	Western Europe (23)	Western Offshoots (4)	Southern Europe (7)	Eastern Europe (9)	Latin America (44)	Asia & Oceania (56)	Africa (56)	World (199)
Population (thousands at mid-year)								
1820	103,005	11,255	33,644	89,821	20,307	736,836	73,026	1,067,894
1870	144,572	45,708	39,981	140,689	37,905	768,472	82,815	1,260,142
1900	178,595	86,396	44,543	208,485	63,919	887,430	95,281	1,564,649
1950	238,957	176,094	68,470	286,116	162,463	1,357,096	223,015	2,512,211
2000	307,577	336,903	132,181	393,418	517,946	3,528,759	737,039	5,953,822
2050	281,243	468,411	154,765	332,374	804,023	5,220,026	1,782,718	9,043,558
Percentage distribution								
1820	9.6	1.1	3.2	8.4	1.9	69.0	6.8	100.0
1870	11.5	3.6	3.2	11.2	3.0	61.0	6.6	100.0
1900	11.4	5.5	2.8	13.3	4.1	56.7	6.1	100.0
1950	9.5	7.0	2.7	11.4	6.5	54.0	8.9	100.0
2000	5.2	5.7	2.2	6.6	8.7	59.3	12.4	100.0
2050	3.1	5.2	1.7	3.7	8.9	57.7	19.7	100.0
Annual rate of growth for interval (percentage)								
1820–1870	0.68	2.80	0.35	0.90	1.25	0.08	0.25	0.33
1870–1900	0.70	2.12	0.36	1.31	1.74	0.48	0.47	0.72
1900–1950	0.58	1.42	0.86	0.63	1.87	0.85	1.70	0.95
1950–2000	0.50	1.30	1.32	0.64	2.32	1.91	2.39	1.73
2000–2050	– 0.18	0.66	0.32	– 0.34	0.88	0.78	1.77	0.84
Increase of population as a percentage of total								
1820–1870	21.6	17.9	3.3	26.5	9.2	16.5	5.1	100
1870–1900	11.2	13.4	1.5	22.3	8.5	39.1	4.1	100
1900–1950	6.4	9.5	2.5	8.2	10.4	49.6	13.5	100
1950–2000	2.0	4.7	1.9	3.1	10.3	63.1	14.9	100
2000–2050	– 0.9	4.3	0.7	– 2.0	9.3	54.7	33.8	100

Sources: Figures for 2000 and 2050 are from United Nations [2001]; figures for 1820–1950 are from Maddison [2001]. Regional classifications follow Maddison [2001].

Note: Numbers in parentheses under the headings refer to the number of countries in each grouping.

coupled with severe famines toward the end of that century.

During the twentieth century, population growth rates increased to high levels in Latin America, Asia, Oceania, and Africa, reversing the global shift in population shares. The share of Europe and its former European-settler countries declined to only 19.7 percent of the global population by the year 2000, less than its share in 1820. Latin America's share more than doubled, and Africa's share almost doubled.

The shift is even more dramatic if we look at the growth in population. Between 1820 and 1980, 69.3 percent of the world's population growth occurred in Europe and Western offshoots. Between 1950 and 2000, however, only 11.7 percent occurred in that region.

United Nations projections imply that the center of gravity of the global population will shift toward Africa during the coming decades. By 2150 Africa's share of the world

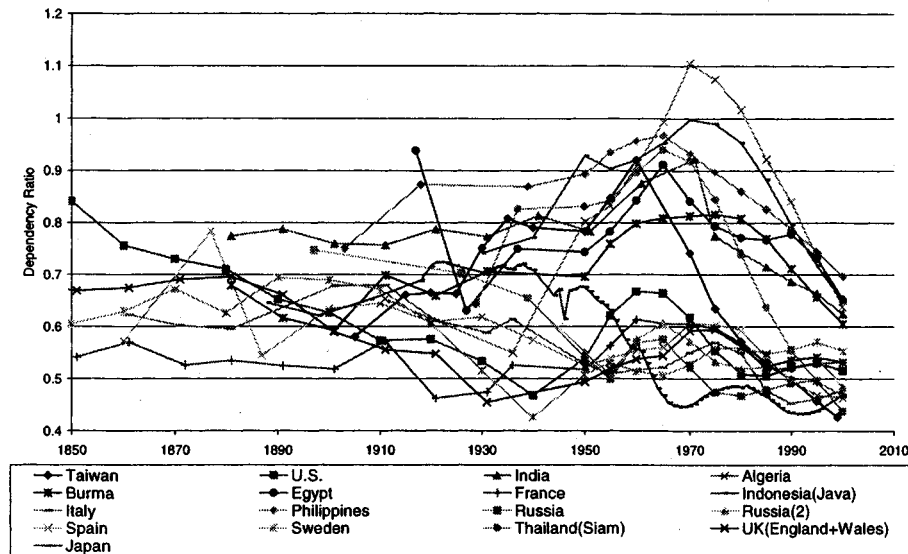


Fig. 2 Age Structure, Selected Countries, 1850–2000

Sources: Available from the authors.

Notes: The dependency ratio is the young population (0–14) + the old population (65 + or 60 +, depending on data availability) divided by the working-age population. Russia (2) consists of former non-Russian members of the Soviet Republic. Data for Japan prior to 1920 include *honseki*.

population will increase to almost 20 percent as compared with only 7 percent in 1820 and 6 percent in 1900. Population growth will by no means be confined to Africa, however. The combined population of Asia and Oceania is projected to increase by 1.7 billion and that of Latin America by almost 0.3 billion by 2150.

Changes in population size and growth rates provide an incomplete picture of the demographic transition because there are also important changes in age structure. The limited data that are available indicate that changes in age structure have been very different in Japan and the West than in the rest of world (Fig. 2). Beginning in 1850 the dependency ratio varied from about 0.5 to 0.7 in Western European countries (France, Italy, Spain, Sweden, and England and Wales). The United States had a much higher dependency ratio in 1850, over 0.8, due to its much higher birth rate, but by 1890 its dependency ratio had fallen within the range found among Western European countries. The overall trend was downward until 1950, when the dependency ratio was close to 0.5 for all of these countries. The post-World War II baby boom, which occurred throughout the West and was most pronounced in the United States, produced a correspondingly large, but temporary, increase in the dependency ratio. Currently, the dependency ratio in the Western countries varies within a relatively narrow band near levels observed in 1950.

Japan's experience is somewhat distinctive. Its dependency ratio increased fairly substantially between 1888 and 1920, when the first population census was conducted.<sup>14)</sup> Between 1920 and the early 1950s its dependency ratio was significantly higher than ratios found in the West. Japan experienced a precipitous decline in childbearing during the 1950s, however, and its fertility rates in recent years are among the lowest in the world. As a consequence, its dependency ratio dropped to a level similar to values found in Western countries in 1970 and later.

The most noteworthy feature of Fig. 2 is the distinctive trend found in the developing countries. The dependency ratios for India and the Philippines were somewhat higher than in the West around 1900. Taiwan's dependency ratio was less than 0.6 in 1905. But the precipitous decline in infant and child mortality and the continuation of high levels of fertility produced an enormous increase in the dependency ratio and the emergence of a huge gap that reached its peak around 1970.

During the last few decades, the gap in the dependency ratios has begun to disappear as birth rates have dropped throughout the world. Taiwan and Thailand have already achieved low dependency ratios, and in countries where fertility has declined more slowly, the gap between the West and the developing world had become much smaller by 2000 than it was in 1970.

If we were to trace out the changes in dependency ratios over the next 50 years, we would likely find that the positions of the developing world and the West would be reversed. As populations begin to age, the dependency ratio will rise precipitously. This will happen first in the West, producing dependency ratios that are substantially higher than today's and higher than those found in Latin America or Asia's developing countries.

#### IV The Impact of Globalization on Population

The impact of globalization on population is both direct and indirect. Globalization has influenced the speed of development, serving as an impetus for faster growth in some countries and retarding growth in others. Increasing factor, product, and capital-market integration allowed GDP to increase in Europe and North America at a faster rate than it would have otherwise. In the long run, all groups gained from the market integration, but some groups gained more than others. In the short-to-medium run, some groups may have lost because of competition from other countries' imports. The pace of development, in turn, has influenced nutritional levels, economic structure and urbanization, levels of literacy, opportunities for women, and other social and economic conditions that

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14) Data for 1888 to 1918 are based on Japan's household registration system. See Taeuber [1958] for a detailed discussion of these data and their consistency with population census data.



influence fertility, mortality, and migration.

Globalization can also have a potent direct influence on population. Perhaps most obvious is the influence on migration of policies toward the international flow of refugees, workers, and their families. The forces of globalization have also directly influenced fertility and mortality. In some instances globalization has been an important positive force, particularly with respect to the globalization of health care. The most notable example of a negative impact is probably the effect of globalization on the spread of disease.

It is beyond our grasp to offer definitive evidence or firm conclusions about the importance of globalization on the important demographic processes described above. Our effort here will be more suggestive in that we hope to identify potentially important ways in which globalization has influenced population.

#### *Divergence in the Demographic Transition*

We hypothesize that market integration was an important factor driving the demographic transition in Europe and North America in the nineteenth century. Increases in life expectancy, in particular, were driven by more rapid development and by the international diffusion and implementation of public health knowledge, nutritional practices, vaccines, and birth control practices [Fogel 1992]. The speed of diffusion increased with globalization, as transportation and communication costs declined throughout its first period (1850–1914), with the telegraph in wide use and, later, telephone networks rapidly expanding. Globalization also led to higher incomes in most countries, thereby allowing new and old practices to be implemented more broadly and deeply. Record population growth rates in Europe and North America were the result.

Why were the enormous gains in life expectancy achieved in the West and, to some extent, in Japan not shared by the rest of the world? Three factors seem to be important, all of which are related either directly or indirectly to the globalization processes that existed at the time. First, living standards improved much more rapidly in Japan and in the West than in the rest of the world. Maddison [2001: 213] estimates that per capita income grew four times as fast in Japan and the West as in other countries between 1820 and 1998. Second, new public health developments and new knowledge about the causes, prevention, and treatment of disease did not diffuse quickly and without cost throughout the world. Third, globalization directly raised death rates in many countries by exposing populations to pathogens for which they had developed no immunities. Europe itself experienced devastating contact with the plague. But other populations in Latin America and the Pacific suffered enormously from their contacts with the West. Japan, on the other hand, enjoyed a higher life expectancy than other Asian countries in part because of its isolation. As compared with China, Japan experienced less devastation from war or disease introduced by outside forces [*ibid.*].

During the interwar period, globalization and de-globalization trends pulled in

opposite directions, accelerating the demographic transition in the West. On the one hand, the disintegration of international capital, labor, and product markets reduced or slowed national incomes significantly during the 1930s and thereby reduced the demand for children and consequently lowering birth rates. On the other hand, continuing advances in communication technology and networks facilitated the rapid diffusion of the new and old stock of public health information and technologies, thereby increasing life expectancy. Sweden provides a good example of a country in which incomes fell in the first half of the 1930s, communication networks expanded during the interwar period, and World War II generated few wartime casualties. Swedish life expectancy continued its secular rise throughout the 1914–46 period, while the downward trend in Swedish birth rates accelerated in the low-growth interwar period, only to stage a momentary recovery when Sweden mounted a vigorous economic recovery in the late 1930s [*ibid.*: 33].

#### *Demographic Convergence*

The re-emergence of globalization after the end of World War II was accompanied by convergence in birth and death rates. What is the connection, if any, between the two events? Some countries, particularly in East Asia, achieved extraordinarily rapid economic growth and rapid demographic change. Japan and Singapore now rank number one and two in the world in life expectancy. South Korea, Taiwan, Thailand, Hong Kong, and Singapore all have fertility rates lower than in the United States. The evidence is quite clear that these Asian countries owe a large part of their development to their success at integrating themselves into the global economy and that their rapid economic growth accelerated their demographic transitions.

A more widespread phenomenon, however, is the delinking of demography and development. Relatively poor countries have now achieved relatively high life expectancies and low or moderate birth rates. The demographic gap between the rich and the poor has declined much more rapidly than the economic gap.

What accounts for this phenomenon? We believe that an important cause is the successful globalization of the health sector. Communication costs have become so small that many people in even the most isolated areas are exposed to new ideas that allow them to achieve better health and to regulate their childbearing. The reduction in transportation costs have also facilitated efforts to increase the supplies of drugs and other medical commodities to populations that were previously isolated.

Complementing these changes, and possibly more important, has been the development of global institutions committed to improving health and reproductive health care throughout the world. Prior to 1950, the effort to improve health in the developing world was the province of underfunded missionaries, a few private foundations, and the nascent efforts of the League of Nations. Large-scale efforts by national, multinational, and private nonprofit organizations became an important force only after World War II. Foreign aid from the United States under the aegis of the Marshall Plan sped the recovery

of Europe and, to a lesser extent, of Japan, South Korea, and Taiwan. Development assistance from Japan, Western Europe, and the United States to poor countries peaked in the 1970s and has declined as a percentage of GDP in the United States over the last 25 years and in Japan in the last 2 years. Aid from donor countries has been particularly important for some developing countries. For example, donor aid funded roughly 20 percent of the health-care expenditures of sub-Saharan Africa countries (not including South Africa) in 2000.

Aid efforts by international organizations have complemented national bilateral programs. The World Health Organization played an important role in introducing environmental sanitation measures; providing essential drugs; vaccinating children in the developing world against such infectious diseases as tetanus, diphtheria, measles, tuberculosis, polio, and whooping cough; and eradicating such diseases as smallpox. The World Bank, the United Nations Children's Fund, Project Hope, Oxfam, and the United Nations Development Programme have all played significant roles in upgrading health care in developing countries and spreading the revolution in death and birth rates to poor and middle-income countries. Relief organizations including the U. S. Agency for International Development, CARE International, the International Red Cross, Medecins Sans Frontieres, the Food and Agriculture Organization, the World Food Programme, and the UN High Commissioner for Refugees have all been instrumental in reducing mortality from disasters and wars.

#### *The Post-World War II Baby Boom*

Completion of the demographic transition in the West was interrupted by the post-World War II baby boom. In Europe, North America, and Oceania, birth rates rose to levels more than sufficient to replace lost wartime fertility. Japan experienced a substantial, but short-lived, increase in birth rates in the early 1950s. Economists disagree about why the baby boom occurred, and the role that globalization processes played depends very much on which theory is accepted.

The Chicago school emphasizes the competing effects of income on the ability to afford children and the value of women's time on the affordability of children [Becker 1960; Becker and Lewis 1973; Willis 1974]. Butz and Ward [1979] argue that fertility increased after the war because rising income led to an increased demand for children. Although the wages of women and, hence, the opportunity costs of childbearing were also rising, the effects were muted because many women were not part of the labor force. Rising wages did draw women into the labor force during the 1950s and early 1960s. Thus, increased female labor force participation and rising wages combined to increase the "price" of children and led to declining fertility in the mid-1960s in the United States.

If this explanation of the baby boom is correct, re-globalization played only an indirect role by stimulating simultaneous economic recovery from the global war throughout the West. Aid provided to Europe by the United States under the aegis of the

Marshall Plan was a critical factor in Europe's fast recovery and could be identified as a global force inducing higher birth rates in Europe. Similar global forces, however, were not present in the United States and could not have caused the U. S. baby boom.

Easterlin [1968] offers an alternative view in which globalization forces played a much more direct role. (See also Easterlin, Wachter, and Wachter [1978].) Prior to 1914, fluctuations in the U. S. economy produced fluctuations in immigration rates. The entry of workers ebbed and flowed depending on domestic economic conditions. When the United States and other countries closed their borders to immigrants after World War I, economic fluctuations produced a fertility swing rather than an immigration swing. Thus fertility declined to low levels during the Depression. Economic recovery after World War II increased the demand for workers at the same time that an unusually small cohort—those born during the Depression—was entering the work force. This led to a rapid increase in wages and rising fertility. Two forces led to the subsequent baby bust. The first was the endogenous cycle generated by successive generations of large and small cohorts. Baby boomers began to enter the labor force in record numbers, depressing wages and their own fertility. The second was that, with re-globalization after World War II, immigration became an important attenuating force so that economic cycles were once again absorbed by immigration as well as by fertility.

#### *Twenty-First Century Mortality Disasters*

The mortality revolution has been disrupted in sub-Saharan Africa and Asia by the spread of HIV, the human immunodeficiency virus that causes AIDS (acquired immunodeficiency syndrome) and in Russia by the collapse of life expectancy. Both phenomena may be due to failed globalization. In sub-Saharan Africa, HIV has been spread by the regionalization of labor markets, refugees fleeing civil wars, and rural residents escaping drought by migrating to cities. Traditional social norms giving men greater power than women in determining sexual practices have combined with migratory labor patterns to produce a situation particularly conducive to spreading HIV [Kauffman and Volks 2002]. Public health systems in sub-Saharan countries have generally failed to communicate information to citizens or to persuade them of its validity. This situation stands in stark contrast to that in Thailand, where campaigns by public health authorities have been successful in markedly reducing infection rates since the mid-1990s.

The decline in life expectancy in Russia stems from increasing rates of alcohol consumption, rising suicide rates, declining levels of medical care, and increasing public health hazards. Most explanations of this deterioration in mortality rates trace back to Russia's decline as a superpower and, more importantly, to its sharp decline in living standards. The fall in Russia's income could be attributed to its de-globalization—manifested in falling international trade—after the dismantling of the communist bloc in 1989 and to its failed attempts at economic reform and integration into the global economy.

## V The Impact of Population on Globalization

Historically, population growth has served as an impetus for exploration and colonization. This is true to some extent in the case of European colonization of the Americas and Oceania, where colonization involved substantial emigration. In both cases, colonization may have served as an outlet from Malthusian pressures in Europe. The same cannot, however, be said of European conquests in Asia and Africa, because they did not lead to substantial emigration. We hypothesize that there are two ways in which population factors may have influenced colonization. First, in the sixteenth and seventeenth centuries European population growth led to increased shortages in agricultural land and provided the impetus for migration to and exploitation of the land-rich, labor-poor Americas, which had undergone depopulation through contact with Europeans. Second, larger populations—and economies—gave European countries the power and wealth needed to mount expeditions and to secure military conquests. How population influences war and security remains a controversial topic, however, about which no strong consensus has emerged [Angell 1936; Simon 1989; Cashman 1993: Ch. 5].

In recent years, population has influenced globalization via two channels: by influencing relative factor endowments and by influencing the national distribution of global income [Helpman and Krugman 1985]. Our analysis emphasizes the first channel and pays particular attention to how this channel has led to the rapid development of East Asian countries over the last 50 years [Mason 2001].

Trade, foreign investment, and immigration are influenced by a variety of forces, with one of the most important being differences in factor endowments—of labor, physical capital, and human capital. Countries with a limited supply of one of these important economic resources gain by “cooperating” with countries with an abundant supply of the same resource. The cooperation can take several forms. The factors themselves can be exchanged, with the labor-abundant economy exchanging labor for capital. Or the countries can specialize in the production of final goods and services and engage in trade. Thus the economies with abundant labor produce labor-intensive goods, and the economies with abundant capital produce capital-intensive goods. Through this specialization, production costs can be minimized and higher standards of living attained.

Important intercountry differences exist in factor endowments, and sometimes rapid changes occur. For example, capital per worker was much greater in the United States in 1965 than in Japan, Taiwan, South Korea, or Thailand. But between 1965 and the early 1990s, high rates of investment in those countries allowed them to greatly reduce the gap and, in the case of Japan, eliminate it altogether (Fig. 3).

There is a striking relationship between demographic variables and factor endowments. Countries with early and fast demographic transitions are relatively well en-

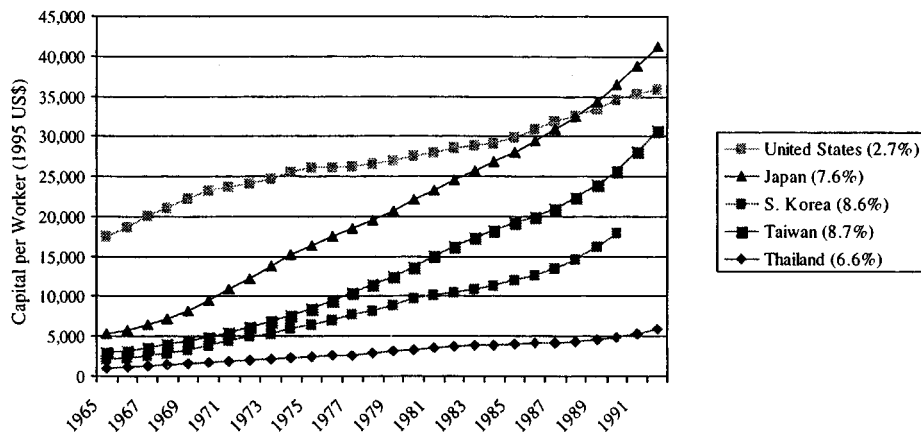


Fig. 3 Capital-Labor Ratio: Selected Asian Countries, 1965-92

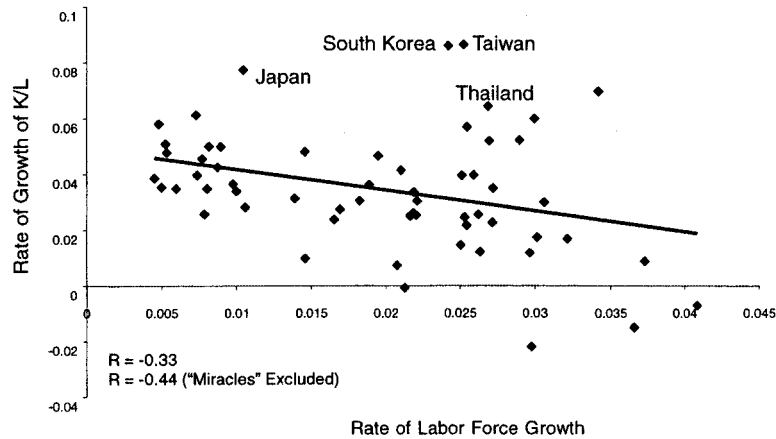
Source: [Summers *et al.* n. d.]

Note: Values in parentheses in the legend are annual growth rates of the capital-labor ratio.

dowed in physical and human capital, whereas countries with late demographic transitions are relatively well endowed in labor. Consequently, countries that are at an early stage in their demographic transition tend to be labor exporters, capital importers, and producers of labor-intensive goods and services. Countries at a late stage in their demographic transition tend to be labor importers, capital exporters, and producers of capital and skill-intensive goods and services. Hong Kong and Singapore, among the first Asian countries to achieve low fertility, are major labor importers, while leading labor exporters are the Philippines and Bangladesh, two countries with delayed demographic transitions.

The relationship is not just a statistical one, however. Population change has a fundamental bearing on factor endowments and the substantial differences between the wealthiest and the poorest countries in the world. The importance of population to relative endowments of physical capital and labor follows from the tautological relationship between capital per worker, investment, and labor force growth. Either a rise in the rate of investment or a decline in the rate of labor force growth produces an increase in capital per worker, known as capital deepening.<sup>15)</sup> The importance of changes in labor force growth is shown empirically in Fig. 4. Countries with the slowest rates of population growth have the highest rates of capital deepening, whereas countries with the highest rates of labor force growth have the lowest rates of capital deepening. Conse-

15) This is a well-known implication of the Solow-Swan neoclassical model. In the simplest case, consisting of no technological progress and Cobb-Douglas production technology, the equilibrium capital-labor ratio is equal to  $K/L = (s/n)^{1/(1-b)}$  where  $s$  is the investment rate (or saving rate in a closed economy) and  $n$  is the rate of growth of the labor force.



**Fig. 4** Capital Deepening and the Rate of Labor Force Growth

Source: [Mason 2001: 213]

quently, those countries that first completed the transition from high to low rates of labor force growth and first completed their demographic transition are relatively well endowed in capital.<sup>16)</sup>

Although the correlation between labor force growth and capital deepening is unmistakable in Fig. 4, there is substantial variation around the regression line. Particularly noteworthy are the unusually high rates of capital deepening achieved in several East Asian countries—Japan, South Korea, Taiwan, and Thailand. What accounts for the discrepancy? The answer is changes in investment rates.

The rise of investment and the resulting increase in capital per worker is one of the most important and distinctive features of the successful economies of East and South-east Asia. Fig. 5 compares investment rates in 1960 with those in 1990 for the countries of the world for which such data are available. For the most part, countries with low rates of investment in 1960 had low rates of investment in 1990. Countries with a high rate of investment in 1960 actually experienced some deterioration over the ensuing three decades. But the successful economies of East Asia are notable exceptions to the general pattern. Most of the Asian “miracle” economies had relatively low rates of investment in 1960, but much higher rates of investment in 1990. Japan was distinctive in that it managed to achieve a high rate of investment in 1960 and an even higher rate in 1990 (Fig. 5). It was this increase in investment rates among the countries of East Asia that

16) If countries maintained a constant labor force growth rate for a sustained period of time, then the capital-labor ratio would stabilize. But in recent years countries with low labor force growth rates have generally experienced declining labor force growth rates, and countries with high labor force growth rates have experienced rising labor force growth rates.

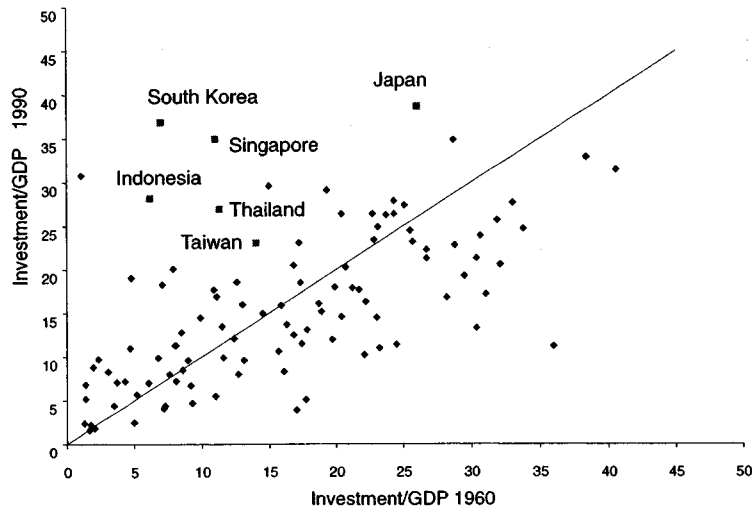


Fig. 5 Investment Rates of 104 Countries, 1960 versus 1990  
Source: [Mason 2001: 214]

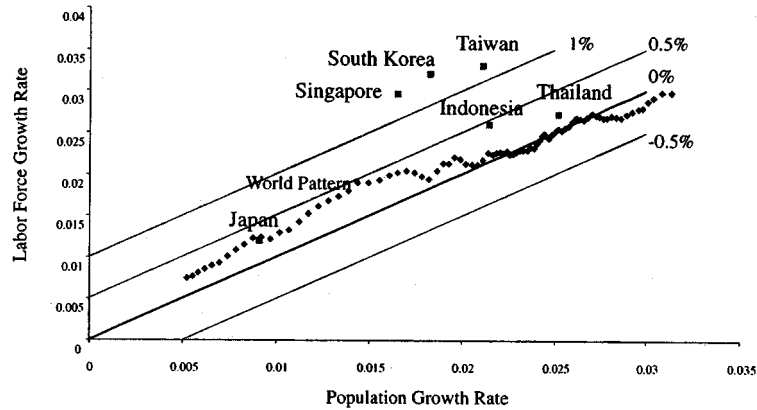
accounts for their rapid capital deepening.

Recent studies have established important connections between the demographic transition and both labor force growth rates and rates of saving and investment. In some simple economic models, population growth rates and labor force growth rates are not even distinguished. Indeed, there is a close connection between the two. But during the demographic transition the labor force growth rate can deviate substantially from the population growth rate. This phenomenon, often referred to as the demographic bonus or dividend, occurs for two reasons. First, the working-age population may grow substantially more rapidly than the total population and, second, female labor force participation may increase substantially as fertility rates decline. Both phenomena have been prominent in Asian countries that have proceeded the most rapidly through their demographic transitions [Bloom and Williamson 1998; Mason 2001].

The systematic differences between population growth and labor force growth are apparent in Fig. 6, which is based on all countries for which data are available for the 1960–90 period. At very high rates of population growth, the growth rate of the working-age population was somewhat slower than that of the total population. As a result, for example, Africa's labor force grew more slowly than its population—a demographic penalty. As population growth declines from high levels, however, the working-age population grows more rapidly than the total population. For the entire 30-year period, 1960–90, labor force growth exceeded population growth by nearly 0.5 percent for countries with an intermediate rate of population growth (about 1.5 percent per annum).

In some countries the gap between labor force growth and population growth has





**Fig. 6** Labor Force Growth and Population Growth: 104 Countries, 1960–90

Source: [Mason 2001: 211]

Note: Diagonals represent growth rates of the support ratio.

been especially large. Singapore, South Korea, and Taiwan are three notable examples. Their labor force growth rates were so rapid because they experienced very large swings in their age structures and large increases in female labor force participation rates. Even though their population growth rates declined rapidly, their labor force growth rates did not. As these countries continue through the demographic transition they will begin to experience much slower labor force growth. This will serve as an additional impetus to capital deepening. However, between 1960 and 1990 it was rising investment rates, not slowing labor force growth, that was responsible for capital deepening in those countries [Mason 2001].

The changes in investment rates presented in Fig. 5 reflect changes in domestic saving rates and international capital flows. Recent research provides persuasive evidence that changes in age structure and increases in life expectancy have had an important effect on domestic saving rates, although the strength of the effect is a matter of continuing debate. Studies by Kelley and Schmidt [1996], Toh [2001], and Williamson and Higgins [2001] conclude that declines in the dependency ratio have had a large positive effect on gross national saving rates. Deaton and Paxson [2000] find that changes in age structure had a more modest effect on household saving, but one that is nonetheless economically important. Simulation studies by Lee, Mason, and Miller [2000; 2001] conclude that increases in life expectancy and declining dependency ratios were both important factors in the rise in domestic saving rates but that demographic change was only partly responsible for the large increases in saving observed in East Asia.

The bottom line: to a significant degree the demographic transition has driven the changes in factor endowments. Countries with rapid population growth and high dependency ratios have, as a consequence, been relatively well endowed in labor and relatively poorly endowed in capital. Countries that completed their demographic

transitions earlier are, as a consequence, relatively well endowed in capital rather than labor. A smaller group of countries, primarily found in East and Southeast Asia, have made the transition to low birth and death rates—demographics that favor high capital-labor ratios and have experienced rapid capital deepening.

The connections between demographics and factor endowments are all the more important in light of the major divergence in age structure between the countries of the West and most of the rest of world during the demographic transition. As discussed above, dependency ratios, life expectancies, and population growth rates differed much less during the nineteenth century than they did during the twentieth century. The divergence in age structure, population growth rates, and life expectancy was responsible to a significant degree for divergent factor endowments and increased incentives for international trade, immigration, and capital flows. The effects of the demographic transition are far from complete. In the coming years, rapid aging and, in some instances, depopulation in Japan, Europe, and to a lesser extent the United States will provide a new impetus for trade, immigration, and foreign investment. The important connection between population and globalization will continue for the foreseeable future.<sup>17)</sup>

Our discussion emphasizes the connection between factor endowments and globalization because of its historical and continuing importance to the relationship between the industrialized and the developing economies of the world. Other forces are also driving globalization, and, as just mentioned, we believe that they will become more important over time.

Most global trade is already between high-income countries with similar factor endowments, not between low- and high-income countries. Modern trade theory offers a variety of explanations for this phenomenon, but emphasizes the importance of specialization and scale economies in the production of goods and services [Helpman and Krugman 1985]. During the last few decades the U. S. share of global manufacturing production has declined in favor of Japan, Europe, South Korea, and other countries. As a consequence, trade within member countries of the Organization for Economic Cooperation and Development (OECD) has increased substantially.

Population growth plays a role in this phenomenon because differential rates of growth in the population (or labor force) will lead to further changes in the regional distribution of production and manufactured production. As noted in section III, the global distribution of population is shifting away from the West toward the rest of the world, especially Africa and Asia. Other things being equal, growth of the working-age population in non-OECD countries should lead to a rise in their share of global manufac-

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17) The empirical literature on this issue is not well developed, but one recent study [Williamson and Higgins 2001] concludes that age structure is having an important effect on international capital flows.

turing production. This in turn should lead to a rise in OECD imports from non-OECD countries and to a decline in trade within OECD (as a fraction of OECD production).

It is unclear whether the shift in the global distribution of manufacturing will produce a substantial increase in global trade or merely influence the trade patterns by shifting trade from within OECD to between OECD and non-OECD countries. Bergoeing and Kehoe [2001] argue that changes in the regional distribution of production cannot account for the rapid rise in global trade in recent years.

## VI Conclusion

The global demographic transition is still incomplete. African nations and some Asian nations are still in early stages of the transition. As their transitions proceed, the potential for changes in trade patterns, capital flows, and immigration looms large. At the same time, the revolution in life expectancy is likely to continue in the developed world unless it is disrupted by widespread use of weapons of mass destruction or the emergence and spread of new infectious diseases. Whether the mortality revolution continues in the developing world is likely to depend upon whether developing countries are able to put institutions in place that facilitate the transmission and acceptance of public health knowledge and new medical practices.

The adoption of social institutions that facilitate information transmission and allow adaptation to changing circumstances is surely the critical element for any society, as efficient institutions will also generate strong economic growth. Globalization and demography are likely to generate a virtuous circle of benefits only when attention is paid to the underlying institutions through which they are filtered. Without well-functioning political and economic institutions, globalization can be dysfunctional for any society. Filtered through a system of incentives that does not reflect social costs or benefits, globalization and demography can interact to produce large populations living in poverty. In sum, the critical task for any society is to get the institutions right.

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